

CONCLUSIONS.

1. The trypanosome causing disease in man in Nyasaland is fatal to goats, sheep, dogs, and the smaller laboratory animals, killing them, without exception, in a few weeks. It is less virulent to cattle, many of which evidently escape.

2. No difference in virulence can be made out in these five Human strains.

3. It is not satisfactorily proved yet to what species this trypanosome belongs, but the Commission at present leans to the opinion that it is *T. brucei* (Plimmer and Bradford).

Plasmodium cephalophi, *sp. nov.*

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[PLATES 4 AND 5.]

It would appear from a perusal of the available literature that malaria of antelopes has not hitherto been described; it is therefore proposed to place on record the discovery of a plasmodium found in the blood of two of these animals in Nyasaland.

This parasite was first seen in the blood of a young duiker (*Cephalophus grimmi*), and was subsequently discovered in another young animal of the same species. Both these small antelope were at the time in captivity, and it was therefore possible to examine slides from day to day, and by this means a large number of parasites at various stages of development were observed, and some of these are figured in Plates 4 and 5.

The acute attack in one antelope, however, only lasted four days, and the parasites soon disappeared entirely from the peripheral blood, whereas in the other only a few parasites were seen; and these have persisted in the blood for some months.

The parasites resemble somewhat *Plasmodium malariae* of man, in that the gametocytes are circular and the schizonts have from eight to twelve merozoites; also amœboid movement is sluggish. They differ, however, in the marked enlargement and paleness of the red cell and in the arrangement

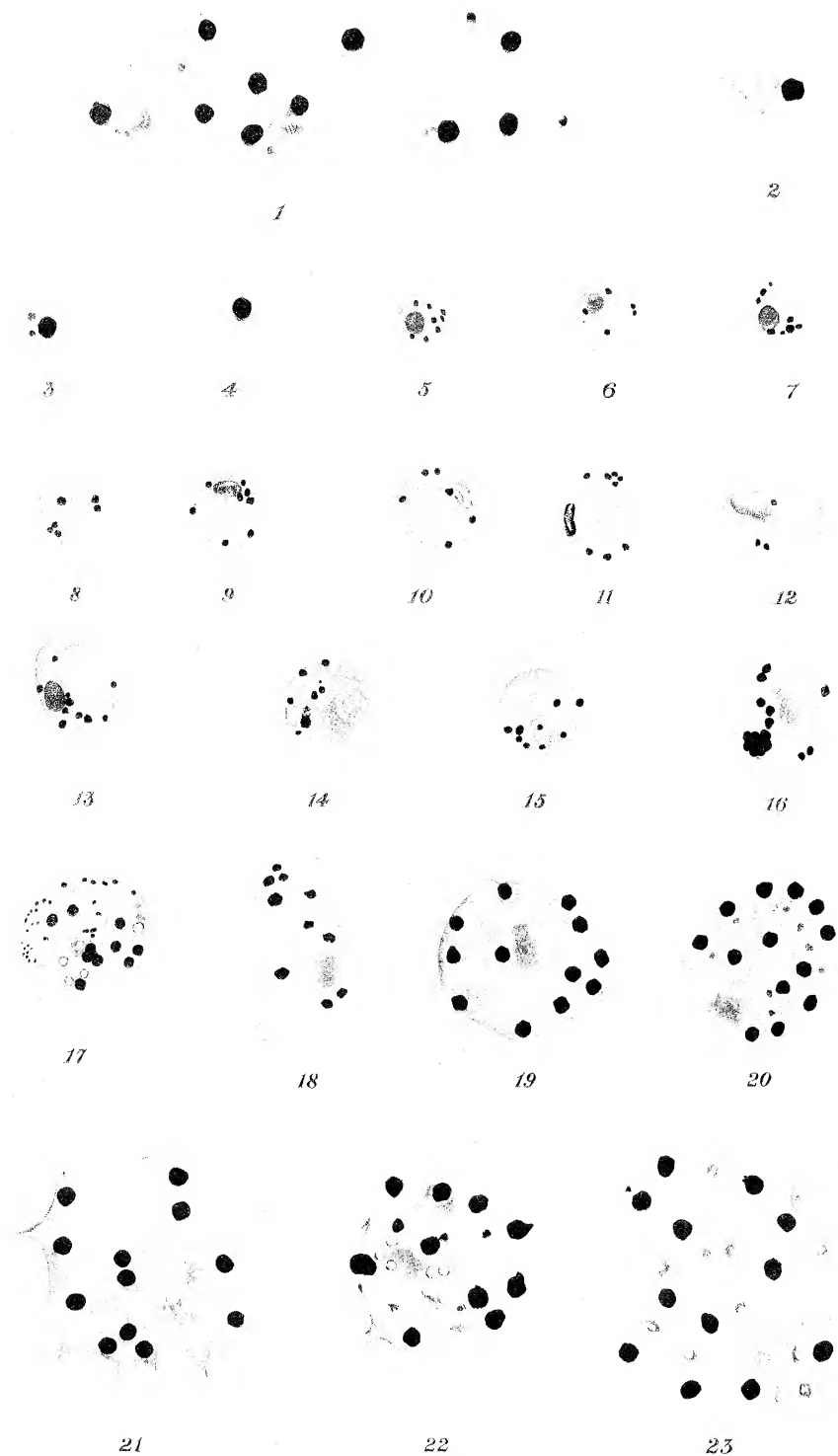
and appearance of the pigment, which is not scattered throughout the parasite, but is collected in a single mass, and is pale yellow in colour (Plate 5). Schüffner's dots have never been seen, but in some instances (Plate 4, figs. 5, 6, and 7) pseudopodia were seen with a scar in the red cell recalling the formation of Maurer's dots in *Laverania malarie* of man. The forms of trophozoite shown in Plate 4, figs. 6 to 12, are, so far as our experience goes, unique, first in the dense blue-staining (Giemsa) of the protoplasm, and, secondly, the great enlargement and marked paleness of the red cell with absence of Schüffner's dots, and the intense concentration of the portion of red cell in the food vacuole. This concentration, as will be seen in the figures, proceeds until nothing is left but a block of gamboge-yellow pigment (Plate 4, figs. 14 to 16). The distended red cells are so delicate that they are frequently ruptured in making the film, as is shown in Plate 5, figs. 7 and 8. The great size of the parasite is also remarkable, some of the free merozoites measuring 4 microns by 3.5 microns, the exact size of a normal red cell of the antelope. A full grown schizont, before cleavage of the protoplasm, measures 10 microns by 10 microns (Plate 4, fig. 19).

The presence in the gametocytes of numerous deeply staining chromatin granules, in addition to the faintly stained nucleus, is also remarkable. The arrangement of these granules in some of the merozoites suggests a relationship with the *Hemoflagellata* (Plate 4, figs. 3 and 23); and in this connection it may be mentioned that one duiker was also naturally infected with a trypanosome of non-pathogenic type, which it is proposed to describe in a future paper.

In films taken some days and even months after the acute attack, the forms shown in Plate 5, figs. 12 to 16, are common, and but for the presence of pigment might be mistaken for faintly stained leucocytes. As these are the most persistent forms (macrogametocytes), attention is directed to them, as they are the forms likely to be met with in examination of blood films of antelope taken in the field.

One of the small duikers appeared out of condition for a few days, while the parasites were numerous in the blood: coat staring, nose hot and dry; but it soon regained its health, and has remained healthy since. The other duiker was apparently not at all affected, although a few parasites could be found in its blood for some six months.

The duiker which was chronically infected was captured in the low country near the Lake shore, and was about three months old when brought to Kasu Hill, where a few weeks later a few parasites were found in its blood. It is therefore probable that it was infected before capture. Whereas



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the other antelope was caught on the plateau and had been in captivity and not in the vicinity of other wild game for at least six months before it was brought to Kasu. As it developed an acute attack a few weeks after it had been placed in the same enclosure with the infected duiker, it would appear that in its case the infection was contracted locally.

The two antelope were first found to be infected in the height of the dry season (October), and although a systematic search was made for adult or larval mosquitoes, none could be trapped or found in or near the enclosure.

In the same compound there were also another young duiker, a young reedbuck, and a young hartebeeste, and although the blood of these animals was examined frequently, no malarial parasites could be found.

If this parasite should prove to be a new one, the name of *Plasmodium cephalophi* is proposed for it.

DESCRIPTION OF PLATES.

PLATE 4.

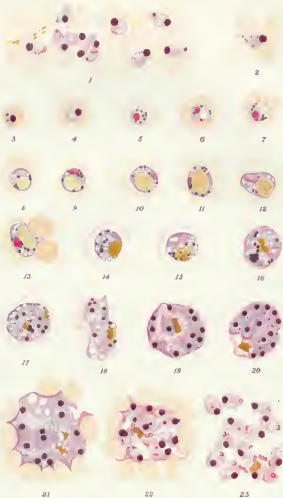
- Fig. 1.—Schizont, ruptured in making the film. The merozoites are drawn along in the direction of the spreading of the blood. The residual mass and free pigment are also shown.
- Figs. 2 and 3.—Merozoites entering red cell. Note the granules in fig. 2 scattered throughout the protoplasm; in fig. 3 there are two granules, one large and one small.
- Figs. 4–15.—Trophozoites, showing marked enlargement and paleness of red cells and concentration of portion of red cell in vacuole.
- Figs. 16–18.—Young forms of “rosette” formation.
- Fig. 19.—Fully developed schizont before cleavage of protoplasm.
- Figs. 20–22.—Schizonts which show commencing cleavage of protoplasm, with a single mass of gamboge-coloured pigment.
- Fig. 23.—Schizont in which the merozoites are completely separated. Some are oval and some circular in shape. All show a V-shaped group of granules at the opposite pole from the nucleus.

Stained Giemsa, $\times 2000$.

PLATE 5.

- Figs. 1–5.—Young parasites, with faintly staining protoplasm and without vacuole. These were found in the same films as the forms shown in Plate 1, figs. 6–14.
- Figs. 6–11.—Gametocytes, with faintly staining nucleus and granular protoplasm.
- Figs. 12–16.—Forms found in the blood some weeks after acute attack (macrogametocytes).
- Figs. 17–22.—Some anomalous forms.

Stained Giemsa, $\times 2000$.



Plasmodium cephalophi sp. nov.



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